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ECONOMIC COMMISSION FOR AFRICA (ECA)

UNION OF AFRICAN RAILWAYS (UAR)

REPORT OF THE WORKSHOP ON RAILWAY TRACK MAINTENANCE, REPAIR AND RENEWAL

Addis Ababa (Ethiopia) 15-17 June 1987

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A. Introduction

1. The workshop on track maintenance, repair and renewal, organised jointly by the United Nations Economic Commission for Africa (ECA) and the Union of African Railways (UAR) was held in Addis Ababa (Ethiopia) from 15 to 17 June 1987 at ECA Headquarters, Africa Hall.

B. Attendance and Participation

2. Representatives from the following railways participated in the Workshop:

- Société nationale des transports ferroviaires - SNTF, Algéria;
- Chemin de Fer Congo-Océan - CFCO, Congo;
- Egyptian National Railways - ENR, Egypt;
- Chemin de fer Djibouto-Ethiopien CFD-Ethiopia/Djibouti;
- Kenya Railways - KR, Kenya;
- Régie des chemins de fer du Mali - RCFM, Mali;
- Société Nationale des Chemins de fer du Zaïre - SNCZ, Zaïre.

C. Opening of the Workshop (agenda item 1)

3. The opening session was presided over by the Deputy Executive Secretary of ECA, assisted by the UAR Vice-Chairman for East Africa.

4. The workshop was opened by Mr. Tchouta Moussa, Deputy Executive Secretary of ECA who welcomed the participants and went on to stress the importance of the workshop which should be viewed as part of the activities of the United Nations Transport and Communications Decade in Africa. He placed special emphasis on the points mentioned below.

The workshop had been planned a long time ago since the need for it became apparent during consideration of the Decade's railway projects and during the technical assistance missions undertaken by the ECA railway expert to various railway networks. ECA had prepared, within the framework of the Decade's activities, a series of outlines for studies of projects, particularly, track-related projects which were the most in number. During his missions on aspects of railway management, the railway expert had observed certain inadequacies in the management of track operations. These various considerations proved that the workshop was timely and necessary.

In selecting the themes to be discussed by the workshop, the nature of the activities covered by the UAR Permanent Way Committee and ECA's experience in certain areas of railway management were taken into account. This was why ECA had been asked to deal with problems of cost allocation, efficiency ratios and regulations while UAR was expected to explain the technical issues because of its experience in this field.

The workshop would also tackle themes that had been discussed on previous occasions. However, the fact that they were constantly being raised definitely indicated a desire for progress and responded to the need for continuing training.

Lastly, the workshop was introducing a new form of fruitful co-operation between UAR and ECA. The Deputy Executive Secretary concluded his statement by wishing the Workshop success in its deliberations.

5. On behalf of UAR, Mr. T. Tchanné Tamerou, UAR Vice-Chairman for East Africa and Director-General of the Djibouti-Ethiopian Railways, welcomed the participants in his turn, and paid a reverent tribute to the Head of State of Socialist Ethiopia, His Excellency Chairman Menghistu Haile Mariam and to the Government and people of Ethiopia for the constant support the UAR had always received from them in its pursuit of the objectives assigned to it.

He explained that the workshop was organised under the regular programme of meetings of ECA and UAR and mentioned the themes that would be presented by the different lecturers on various aspects of management and track maintenance, repair and renewal techniques.

He underscored the financial problems facing UAR at the moment and commended the UAR staff who, notwithstanding the constraints, had made enormous sacrifices and were willing and determined to pursue the difficult but exalting task entrusted to them by the African railway authorities.

In conclusion, he wished the workshop every success.

6. Following the statement by the UAR Vice-Chairman, the ECA Deputy Executive Secretary officially declared the workshop open.

Election of Officers (Agenda item 2)

7. On the proposal of the UAR General Secretariat, the following officers were elected:

Chairman - Chemins de Fer Djibouto-Ethiopien CFD.

1st Vice-Chairman - Société Nationale des Transports Ferroviaires - SNTF.

2nd Vice-Chairman - Kenya Railways KR.

Rapporteurs - ECA and UAR.

Adoption of the agenda and organization of work (agenda item 3)

8. The following agenda was adopted:

1. Opening of the workshop

   (a) Statement by the ECA Deputy Executive Secretary;

   (b) Statement by the UAR Vice-Chairman

2. Election of Officers

3. Adoption of the agenda and organization of work

4. Workshop paper No. 1 by the ECA representative on "Criteria for distinguishing between investment expenditure and track maintenance and renewal expenses for statistical and cost accounting purposed".

5. Communication by the CFCO delegate on "Track renewal and maintenance".

6. Workshop paper No. 2 by the ECA representative on: "Management information on mechanized and manual track maintenance and renewal methods. Follow-up of maintenance operations".

7. Communication by the RCFM delegate on: "Track maintenance mechanization at the Régie des Chemins de Fer du Mali (RCFM) and at the Régie des Chemins de Fer Abidjan/Niger (RAN).

8. Workshop paper No. 3 by the ECA representative on: "Basic regulations on track maintenance and renewal".

9. Any other business.

10. Adoption of the report and closure of the workshop.

9. The programme of work was adopted without amendment.

10. The delegates simply requested that papers available in French and English should not be read in order to leave more time for discussion of the proposed themes. This would make the workshop more lively and more productive.

11. The delegates also expressed the hope that recommendations would be made at the end of the dicussion on each of the papers presented.

12. Following the adoption of the agenda and programme of work, the ECA and UAR representatives explained the reasons that had prompted the holding of the workshop and the style that was to mark its development.

13. The representative of ECA spoke about the organization and proceedings of the workshop as well as the subsequent follow-up.

The organization of this workshop ushered in a new form of co-operation between ECA and UAR with ECA concentrating on management problems while UAR took care of technical matters.

The proceedings of the workshop would be characterized by the use of the participative method whereby the specialists presenting the papers acted as discussion leaders. There would be two types of evaluation: evaluation by the participants and evaluation by the organisers and discussion leaders.

The follow-up of the workshop would be initiated by ECA and UAR which, within a period of six months, would request the railways represented at the workshop to provide information on their application of the workshop's recommendations.

14. The UAR representative commented briefly on the papers being presented by the railway delegates. They were mainly technical papers relating the experiences of the railways under consideration. During the debates, it would be worthwhile comparing the experiences of other railways and recommendations made would help to consolidate the procedures and harmonize the methods used.

These papers contained full and well-researched information on recent examples of the development of methods and techniques utilized by the railways concerned and the ensuing discussions should facilitate the formulation of practical recommendations for all railways.

The debates of the workshop whose hallmark was efficiency ought to be held in this spirit.

D. Summary of Statements and Discussions, Workshop Paper No. 1 by ECA Representative (agenda item 4)

15. The first paper introduced by the representative of ECA dealt with criteria for distinguishing between investment expenditure and track maintenance and renewal expenses for statistical and cost accounting purposes. The aim of the paper was to demonstrate, in general, the need to adopt the principle of using railway tariff revenue to finance renewals considered part of operating expenses. An analysis of the current accounting methods showed that they were neither strict enough nor did they differentiate between renewals and investments. In fact, renewal expenses were incurred to maintain the production capacity of an establishment at a constant level while investment expenditure aimed at increasing that capacity.

Recommendations had been made on the evaluation of renewal expenses and the modalities of cost allocation. Logical criteria for distinguishing between investment expenditure and renewal expenses should be adopted, if possible, in the form of international standards, and the tariff policy should ensure that renewal expenses are financed from railway tariff revenue.

The difficulties encountered in this area by railways were well known; however, the subject deserved a great deal of thought and making the right decisions would go a long way to improve railway management.

16. The statement by the ECA representative was followed by a lengthy and lively discussion among all the delegations present.

Observations were made mainly on the difficulties encountered by the railways in classifying maintenance and renewal expenses for accounting purposes. These difficulties usually impeded adherence to any planned programmes and were recognized as a basically major problem. A general consensus was reached on the need to formulate recommendations aimed at: better preparation of the cost accounting plan for railway operating expenses; the adoption of a precise terminology for track renewal and maintenance operations; and the definition of criteria and ratios denoting the quantity and quality of the job performed during such operations.

Communication by the CFCO delegate (agenda item 5)

17. Owing to the increase in the traffic of goods and minerals, and, the frequent occurrence of railway incidents due to railway tracks, the Congo-Ocean railways (CFCO) was compelled to plan and carry out works to improve the carrying capacity of the superstructure and ensure the safe movement of trains.

Given the limited financial resources, improvements were made only on those sections with very heavy traffic and in such poor condition as to jeopardize the safety of the trains.

Besides the regular maintenance the network carried out renewal operations for the replacement of rails, sleepers, ballast as well as complete renewal of the track.

Most of these activities were performed by track maintenance gangs assisted by temporary workers. However, complete renewal operations were gradually mechanized in conformity with the current mechanization programme launched by the Agency.

Increased mechanization during the execution of works carried out by the railway establishment yielded satisfactory results and improved the time-period for the execution of works.

Unfortunately there could not be full mechanization since procurement of the proper machinery called for sizeable investments and this was not possible considering the current financial situation. The problem could be solved within the framework of the interconnections recommended by UAR. It would therefore be in our networks' interest to contribute actively to the implementation of the relevant programmes.

18. All the delegations took part in the pertinent and fruitful discussions that followed the communication by the CFCO delegate. Those discussions highlighted the various technical problems relating to track maintenance and renewal: rail lubrication methods, rail welding techniques, comparison of manual renewals carried out under railway supervision and mechanized renewals carried out by contractors, time-periods allotted for the performance of track operations, conditions for the use of a ballast-scarifier and screening machine and the realignment of curves by using the geometrical method.

The relevant explanations provided by the CFCO delegate made it possible to evaluate the quality of the maintenance and renewal methods used by the CFCO Railway.

19. The CFCO delegate also spoke of the efforts made and difficulties encountered by his railways to apply that portion of the cost accounting plan relating to track maintenance. Today, there was proper management of maintenance because of the results obtained. The documents on the methodology applied would be communicated to UAR and ECA.

Workshop Paper No. 2 by the ECA representative (agenda item 6)

20. The second paper presented by the ECA representative, concerned management information on track renewal and maintenance methods and the problem of utilization of mechanization and manpower. The aim of this paper was to draw the participants' attention to the need to have management information in these areas. Of course such information would differ depending on whether operations were labour-intensive or capital-intensive. In order to guide the choice of information, the cycle of maintenance operations was described for each method of maintenance used.

In the case of maintenance and renewal, the participants' attention was drawn to:

- the need to devise statistical and accounting models for the processing of data;

- the advisability of adopting a specific method of cost calculation.

The ECA representative concluded that it was necessary to compile a whole range of management information in order to facilitate decison-making on management. Such management information would emanate from the methods currently utilized by certain railways.

21. The annex to workshop paper No. 2 should be considered an example of management information on track maintenance. It contained various types of follow-up track maintenance operations.

The follow-up consisted in an immediate inspection of such operations and the recording of data according to accounting and statistical methods. Standards were proposed for the classification of types of operations while notions of efficiency were also reviewed. The document underscored the need to analyse results in order to improve management methods.

Such follow-up could be done during inspection tours by track maintenance gangs or heads of sections and possibly with the use of track examination equipment.

The follow-up of time spent by the personnel should relate to clearly defined activities. Work yields could be calculated and the results obtained would be compared with the efficiency indicators determined on the basis of experience.

The follow-up of spare parts and materials would make it easier to estimate supplies.

In any case, the document was only an example and participants were invited to formulate recommendations and proposals.

22. The statement by the ECA representative was followed by a lively debate. Practically all the delegations took the floor to explain the situation prevailing in their respective railways.

It was suggested that UAR adopt a uniform terminology to designate the various types of maintenance and renewal operations.

23. Some railways used evaluation criteria and significant ratios to assess the quality and quantity of output. One railway representative mentioned the existence of a "spread sheet" where such results and indices were recorded. Specific maintenance and renewal operations costs were calculated only by few railways. The workshop hoped that accounting and statistical models as well as specific cost calculation methods based on experiences of some of the railways, would be defined by UAR. Recommendations would be made along those lines.

24. The problem of the "programme-calendar" was stressed. The programme-calendar currently used at the railways provided useful information. However, it did not permit accurate evaluation of operations required for maintaining tracks in good condition. It was suggested that UAR give serious consideration to the problem in order to establish standards that would facilitate a reformulation of some of the basic components of the programme calendar so that the latter could become a complete and effective working tool.

Communication by the RCFM Delegate (agenda item 3)

25. Railway tracks should never be neglected, not even for one instant. The slightest distortion could cause extensive damage to equipment and become worse if not attended immediately. This was why a sound maintenance policy was necessary. The paper described the composition, situation and equipment for track maintenance operations at RCFM and RAN.

African networks had developed to a stage where manual maintenance had to give way to rational mechanized maintenance. The aim of mechanized maintenance was to carry out all the basic operations required to maintain the homogeneity of the constituent parts of the track so as to ensure maximum safety. Mechanization made it possible to rationalize the operations to be carried out and obtain a good track with a stable track bed, proper lay out, stock and fastenings in good condition, good levelling and good re-alignment.

The two networks used a combination of mechanized and manual maintenance for several reasons, in particular, the availability of cheap labour and shortage of financial resources to acquire the proper machinery. On the other hand, railway officials' constant desire to enhance efficiency was leading them to introduce mechanized track maintenance in order to improve the quality of service, modernize track renewal and maintenance techniques and relieve the staff of the more arduous tasks.

The pre-conditions for mechanization of track maintenance were:

1. Adequate ballasting of tracks: a ballast profile as close as possible to the prescribed standard so as to allow effective use of mechanized equipment;

2. Training of staff to operate and service the machines;

3. Availability of minimum facilities (workshop for example) for the servicing of equipment;

4. Considerable traffic density (train, tonnage, speed, frequency) causing the track to deteriorate to such an extent that procurement of machinery was necessary in order to obtain a reasonable hourly yield within a relatively short space of time;

5. Adequate network density (length of lines open to traffic) - although not a determining factor, could necessitate mechanized maintenance;

6. A genuine will to modernize track maintenance policy;

7. Track equipment in satisfactory condition.

The various machines and types of mechanization were enumerated in the RCFM paper which also provided some information on the practical organizatioin of mechanized maintenance, particularly, as regards structure and staff, programmes of mechanized maintenance and the advantages of mechanized packing as compared to manual packing.

In conclusion, mechanized track maintenance policy should aim at the gradual replacement of man by the machine without excessive spending.

26. The summary of the paper by the RCFM delegate was followed most attentively and elicited pertinent statements from the representatives of SNFT, CFCO, Kenya Railways and SNCZ in particular. The discussions revealed that some railways had experienced certain difficulties in mechanizing track maintenance operations (packing, for instance) while others had obtained conclusive results in that area.

The problems of mechanization should be approached with caution even if it were obvious that mechanization constituted progress to which all railways should aspire. Mechanization should not be carried out in isolated actions but should rather form part of a global policy providing effective and economical conditions.

Some networks had mechanized equipment for track renewal and maintenance. Recent experience had shown that the rental of such equipment to private national or foreign firms could help to make it pay.

A recommendation on this issue was deemed necessary. To guide its member railways, UAR should define criteria setting forth the best conditions for the achievement of mechanization adapted to the specific characteristics of African railway networks.

Workshop Paper No. 3 by the ECA Representative (agenda item 8)

27. In workshop paper No. 3, the ECA railway expert tackled basic regulations on track maintenance and renewal and recalled the fundamental role of regulations which made it possible to:

- define general and specific tasks;

- assign responsibilities to departments and employees;

- participate in the training of staff.

The regulations were also classified into:

- normative - general regulations;

- operative - concerning procedures documents.

A general observation was made on the inadequacy of existing regulations which were often ill-adapted and outdated. It was imperative for railway officials who were aware of this problem to decide to resolve it. This was a difficult task which had to be performed on a continous basis.

The arguments contained in workshop paper No. 3 were obviously applicable to all regulations but the problem of track regulations was particularly delicate.

This workshop should provide some answers to this basic problem which was well-known to all.

28. During the debate that followed the ECA representative's presentation, the delegations present spoke about the state of their railway regulations. Railway officials were aware of the magnitude of the problem, said the delegates who informed the workshop of the measures that had been taken in that connection. At the instance of the heads of the railway departments concerned, considerable and rewarding efforts had been made in this area by the ad hoc committees set up. On the whole, the delegates felt that this was a major problem which should be resolved in several successive stages as far as both the general regulations and procedures documents were concerned. One delegate pointed out that in the case of his railways, owing to the establishment of a single network system, it was very difficult to formulate proper regulations. Another delegate mentioned the lack of documentation to help officials in the drafting of suitable and effective regulations that were adapted to the characteristics of each railway network.

It was deemed necessary to draft a general recommendation on the establishement and improvement of appropriate general regulations defining the standards, principles and operative rules specifying the various jobs to be done.

Any other business (Agenda item 9)

29. Under this item, the ECA representative announced that a co-operation agreement between ECA and UAR was to be signed soon.

The co-operation agreement between ECA and UAR would stipulate in particular that representatives of the two institutions would meet from time to time to work out details of activities to be undertaken mainly for the purpose of assisting UAR and the railway networks, it being understood that the final decision would rest with the UAR, a specialized agency of OAU.

E. Recommendations (agenda item 10)

30. The following recommendations were put forward by the participants:

1. The networks should have a cost accounting manual covering all items under "Way and works";

This responsibility was entrusted to the UAR Technical Committee with the support of ECA.

2. A study providing efficiency indicators and production cost indices for track renewal and maintenance was indispensable to networks;

The UAR was asked to prepare this study in collaboration with ECA.

3. The problem of intervals for track operations should be re-examined in terms of present-day realities, the Networks' resources and new techniques;

UAR was entrusted with this study.

4. The UAR Technical Committee should pay special attention to the rewording of the programme-calendar to ensure that the budgetary estimate is as realistic as possible;

5. UAR was requested to seek ways and means of standardizing the terminology used by the various Networks;

6. Statistical and cost calculation methods were indispensable to the Networks and UAR should carry out the relevant studies in collaboration with ECA.

7. The UAR Technical Committee was asked to determine the general criteria to be strictly observed in studies conducted with a view to mechanizing track maintenance and renewal operations.

8. In general, the delegates suggested that rental of network machinery to contracting firms should be taken into account when seeking solutions to the problems of profitability of heavy maintenance machinery.

9. It was recommended that Networks do their utmost to acquire regulations that were well-adapted to their characteristics and needs.

F. Closure of the Workshop

31. The closing session of the workshop began with a communication by the rapporteurs on the evaluation of the workshop (see annexes 2 and 3 attached). The representative of ECA and the Vice-Chairman of UAR delivered statements of thanks.

The workshop was then declared closed by the ECA representative.

Documents submitted

Documents submitted by ECA

TRANSCOM/26 - Criteria for distinguishing between investment expenditure and track maintenance and renewal expenses for statistical and cost accounting purposes.

TRANSCOM/27 - Management information on mechanized and manual track maintenance and renewal methods.

Annex - Follow-up track maintenance operations.

TRANSCOM/28 - Basic regulations on track maintenance and renewal.

Documents submitted by UAR

TRANSCOM/112 "Mechanization of track maintenance in the Régie des Chemins de Fer Abidjan/Niger (RAN and Régie des chemins de fer du Mali (RCFM).

TRANSCOM/114 - Track maintenance and renewal (Agence Transcongolaise des communications. ATC - Chemin de Fer Congo - Océan - CFCO.

Evaluation of the Workshop By the Participants

A workshop evaluation form was distributed to the participants. On the whole, all the delegations answered the questions in the form. The 24 replies received and the comments made are mentioned below.

1. Duration of the workshop

The duration was considered "just right" by some and "too short" by others.

2. Daily schedule

It was considered "just right" by practically all the participants.

3. Content of the workshop in terms of meeting the participant's needs

Half of the participants felt that the content met their needs "to a sufficient extent", a number of them felt their expectations had been fulfilled to a "very large" or to a "large extent".

4. Level of the workshop

It was considered "adequate" by all the participants. Delegates deplored the small number of railways represented as this had affected the exchange of ideas.

5. Subjects considered of interest

Many participants expressed the hope that the mechanization and management problems would be actively followed up.

6. Subjects that were not dealt with or were inadequately covered

Half of the participants felt that the subjects proposed had been "adequately covered". Other subjects were suggested: maintenance of structural works for instance.

7. Suggestions of changes for improvement of the workshop

Some participants felt that the time allocated for discussions should have been longer, and the duration of the workshop could have been extended.

8. Balance between lectures and discussions

The balance was considered "just right" for a workshop.

9. Presentation of papers and ability to deal with the subjects

Nearly all the participants considered the presentation and ability to deal with the subjects "good" or "excellent".

10. Exchange of views with the lecturers and fellow participants

On this point, the participants' appraisal was either "good" or "very good".

11. Usefulness of the workshop, professionally

Nearly all the participants agreed that the workshop was professionally beneficial.

12 Application of knowledge acquired during the workshop

The replies to this question varied a great deal. Half of the participants felt that they would have an opportunity of applying many of the measures recommended.

13. Organization of similar workshops

All the participants hoped that similar workshops would be organized.

14. General comments

The participants considered the workshop interesting and beneficial as a whole.

ECA/UAR Comments on the Workshop as a Whole and on the Participants' Evaluation of the Workshop

The organizers (ECA/UAR) and the discussion leaders were required to comment on the workshop as a whole and on the participants' evaluation of the workshop. The replies and comments are referred to below.

1. Attendance

Attendance was very good as far as the number of delegates was concerned but very poor when it came to the number of railways represented.

On the whole, the group was homogeneous.

2. Preparation

The delegates from participating networks showed that they were highly conversant with the subjects dealt with by the workshop.

3. Discussions of the workshop

The discussions were considered excellent, lively and interesting. The participants put life into them.

4. Recommendations

Many judicious recommendations were made thus proving the participants' awareness of the various problems.

5. Final impression

Despite the small number of networks represented, the workshop was held under excellent conditions and participation in the discussions was intensive.

Lastly, the workshop was interesting and beneficial.

LISTE DES PARTICIPANTS/LIST OF PARTICIPANTS

I. Delegates of Member Networks of the Union of African Railways

1. Société Nationale des Transports ferroviaires (SNTF)

Mr. MEKREBI Abdelkader
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3. Régie du Chemin de fer du Mali (RCFM)

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Régie du Chemin de fer du Mali

4. Société Nationale des Chemins de fer Zaïrois (SNCZ)

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